

WORK FORCE SAFETY MONITORING USING IOT

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ABSTRACT

Safety is a major problem in construction works. There is no proper solution to solve the problem. People's safety is not ensured in the construction and mining works. In most of the cases, the problem occurs due to work stress or poor health conditions. Some of the accidents occur where people fall down from heights and left unnoticed which leads to death due to lack of medical attention. According to the international report almost 48000 workers die every year due to workplace accidents and the construction site tops the list with 24.20 percent. However, most deaths occurred were preventable.

This project aims to develop smart wearable devices such as band and helmet using various sensors that will help in monitoring the health and safety of workers. The device with the help of IOT we can identify the health parameters such as pulse, temperature, surrounding gasses etc. These values will be updated in the IOT app and the caretaker or immediate manager or supervisor can notice these values in their

smart phone. The prototype developed will be useful if it is implemented and use as a small device. In construction sites, many laborers will be working for the completion of the construction project. To monitor these labours, many supervisors were appointed.

The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network. It used to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. In case we want to create advanced systems using different algorithms, Wi-Fi or Ethernet connection is connected to our tools, equipment, and devices controlling them by smart phone applications or internet websites.

INTRODUCTION

This project is based on IOT TECHNOLOGY, and uses EMBEDDED SYSTEM for implementing IOT based safety and health monitoring system for construction and mining workers. The

objective is to develop smart wearable devices such as band and helmet using various sensors that will help in monitoring the health and safety of workers, such that this project can be used to prevent health problem like heart problem, fever, covid, etc.. for workers and avoid them from working and can easily identify, and send them to hospital immediately before bigger problem.

LITERATURE SURVEY

1. Daryl Abel et.al (2015) presented a system for fixing an appointment with the doctor or medical consultant. By making use of this system the patients can easily fix appointments using a simple mobile application. A mobile application is developed and road map is attached for further enquiry, they mainly stress on appointment and cabin booking.

2. M. Anil Kumar et.al (2015) Proposed a health care scheme which focus on the measurement and Monitoring the various biological parameters of patient's body like heart rate, oxygen saturation level in blood and temperature using a web server and android application, where medical consultant can continuously monitor the patient's vital signs on his smart phone using an Android application. And also, the patient details will be stored on the server and

doctor can a make use the information whenever needed from anywhere.

3. Edison R. Valencia-Nunez et.al (2016) proposed a model to determine the arrival timing of the ambulances using the type of software called geospatial software. The hospitals there by get ready for the treatment of the patients in the ambulance. The system reduces the risk of patients who are arriving in the ambulance.

4. Prashant Salunke (2017) has proposed a system that reduces the risk of patients to visit the doctor every time. The real time data of the patients are collected by the doctor through the cloud platform and the suggestion are given by the medical professionals to the respective patients. The system is developed at the aim of reducing the cost, increasing the quality of life and to enrich the real time experience. The system is provided with Intel Edison Which is a computer-on-module that was offered by Intel as a development system for wearable devices and Internet of Things devices which provides multitasking capability and low power consumption thus by making it an effective system.

5. Sarfraz Fayazkhan (2017) developed a system for monitoring the patient's conditions using a mobile phone through wireless body sensor arear network. Here

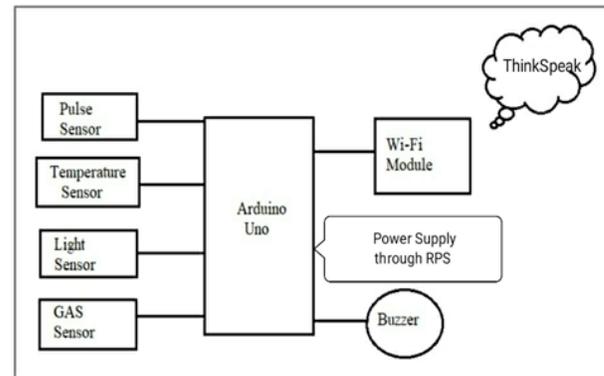
RFID based WBAN is used to transmit the information directly to the mobile phones. In this paper the RFID Tags are used to establish the wireless communication. The main advantage of the system is information is transferred securely through RFID tag.

6. Devashri Deshmukh (2017) proposed an android based human services observing framework where the patient's essential sign, for example, circulatory strain, spo2, heart rate and so on are checked and remotely sent to the particular restorative expert. The fundamental point of the task is to send the data remotely through remote sensor systems. Acquired data by the sensor is sent to the arm controller and then remotely to the web-based interface which decreases hospitalization and help cost.

7. Spurthy Talakalaet (2017) have planned an original thought for observing the patients points of interest, for example, ECG, EMG, pulse, blood glucose, heart rate , temperature utilizing a web server and android platform, where specialist can continuously monitor the patients using a simple application. In android application it gets the Bluetooth information with help Bluetooth attachment Programming interface and read the information with the assistance of read stream. The principle favorable circumstances are remote

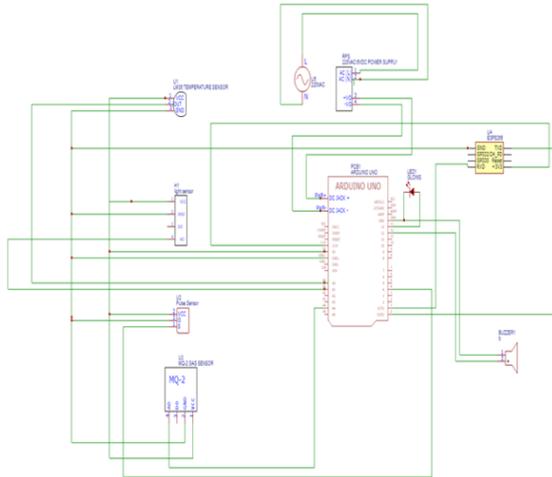
checking framework, area can be explored without utilizing GPS, naturally acquire the situation with no constraint.

BLOCK DIAGRAM

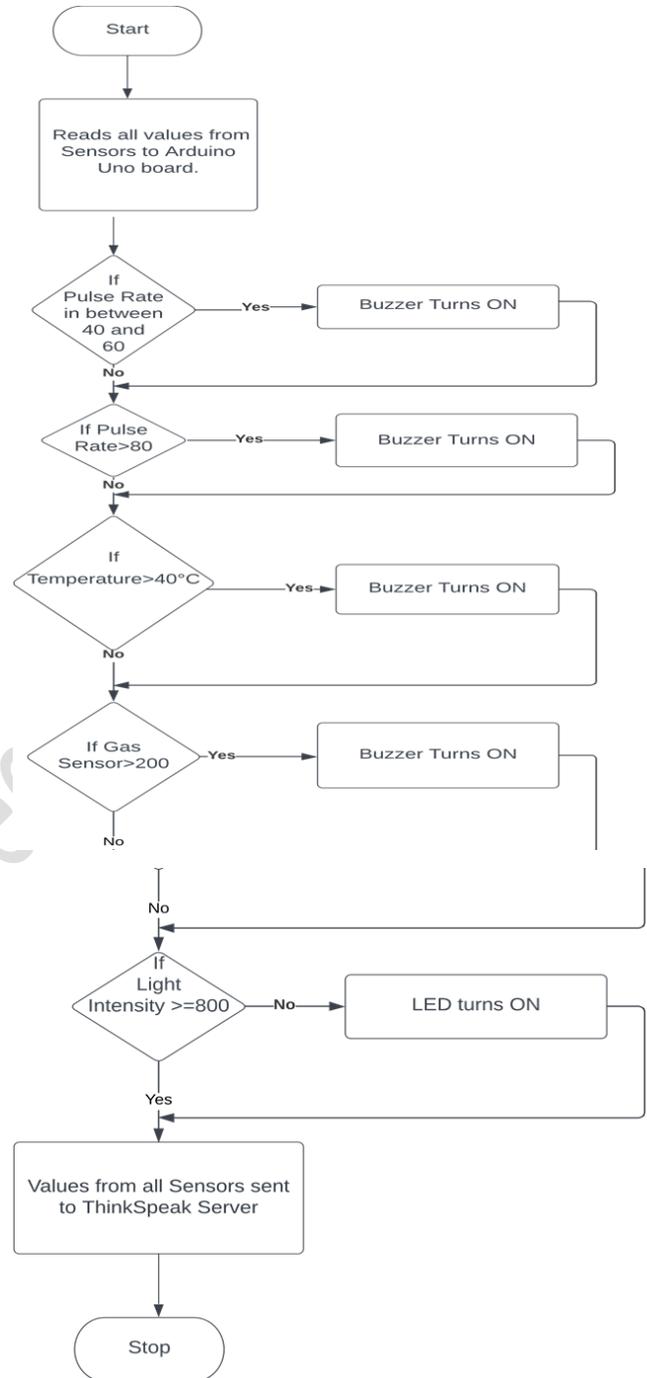


This is a simple block diagram that explains the IoT Based Health Monitoring System using ESP8266 & Arduino. Pulse Sensor, LM35 Temperature Sensors, MQ-2 Gas Sensor, and Light sensor LDR measure's pulse rate, environmental Temperature, Surroundings gases leakage, and Light Intensity respectively. The Arduino uno gets it's operating voltage from designed Regulated Power Supply Circuit. The Arduino processes the code and sends that information to our "Think Speak" website through ESP8266 Wi-Fi module connects to Wi-Fi and sends the data to IoT device server. The IoT server used here is "Think Speak".

Finally, the data can be monitored from any part of the world by logging into the Thing speak Website.



This is the circuit diagram for our proposed system. In our project we have taken 230V AC is supplied to Regulated Power Supply and it's produced 12V DC, which is useful for operating Arduino uno. Now, all sensors are connected to Arduino uno and information produced regarding health of worker is transmitted to ThinkSpeak server through esp8266 wifi-module and that data can be observed in thinkspeak website through log into website.



1. Before Supplying power to the project circuit, make sure of proper connections and Coding uploaded to Arduino Uno.

2. Now, all LED's of the sensors and Arduino uno gets lighted on by the power supply from RPS.

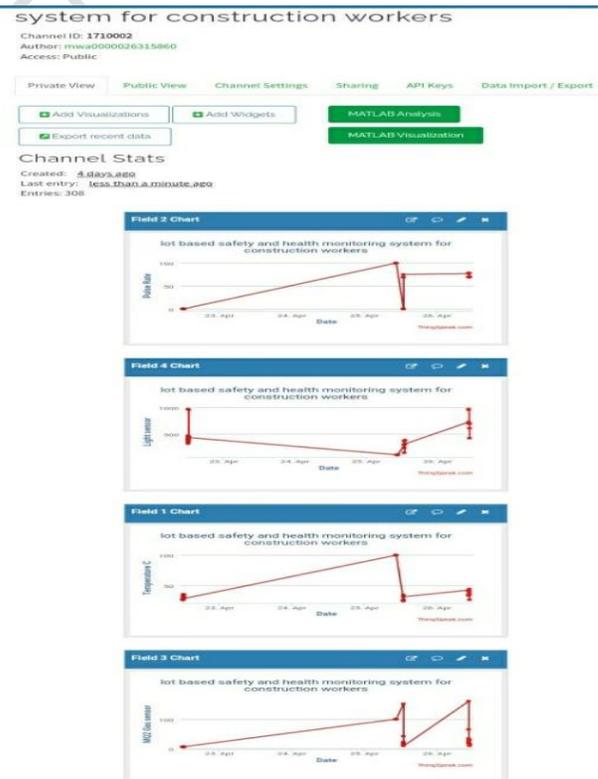
3. We coded Arduino regarding pulse sensor as "80" as maximum limit. Whenever pulse rate gets increased than 80, then buzzer connected to Arduino uno produces High Audio Signals/ Sounds like Alarm.

4. Also, we have coded Arduino regarding temperature sensor as "40oC" as maximum limit. Whenever temperature gets increased than 40oC , then buzzer connected to Arduino uno produces High Audio Signals/ Sounds like Alarm.

5. Similarly, we have coded Arduino regarding MQ-2 Gas sensor and LDR Light Sensor as "200"ppm and "800" as their's maximum limit respectively. Whenever ppm value and light intensity gets increased and decreased than "Predefined Value's" respectively, then the buzzer connected to Arduino uno produces High Audio Signals/ Sounds like Alarm.

6. Also, we have connected an LED bulb to Arduino uno, such that whenever the LDR value decreased less than 800 (i.e; light intensity decreases in room), then LED Bulb glows, Else LED Bulb turns OFF.

RESULT



CONCLUSION

The design and implementation of a health monitoring system using IoT are presented in this study. This IoT-based device allows users to determine their health parameters, which could help regulate their health over time. Eventually, the workers and people could seek medical assistance if the need arises. They could easily share their health parameter data instantly within one application with the doctor, and this can be achieved with IOT Technology. The most important thing is that manager can monitor the health of any worker at any distance. The system will measure a patient's body temperature, heartbeat, surrounding gases, and sends the data to an app or our website through wi-fi module. This information allowing the workers and also the patient can able to see their current health state quickly. Asthma workers, patients with cardiac or heart related diseases, COVID-19 patients, excessive smoke and workers who consumed alcohol etc.. can be find out easily and can take necessary action regarding it with doctors if the need arises, and helps to keep their health in check over time with the help of the system we developed.

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